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- (58) **Field of Classification Search**  
None  
See application file for complete search history.

- (56)
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- ### Related U.S. Application Data

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- (52) **U.S. Cl.**  
CPC ..... *H01L 29/66348* (2013.01); *H01L 29/32*  
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- (57) **ABSTRACT**

A method of manufacturing a reduced free-charge carrier lifetime semiconductor structure includes forming a plurality of transistor gate structures in trenches arranged in a semiconductor substrate, forming a body region between adjacent ones of the transistor gate structures and forming an end-of-range irradiation region between adjacent ones of the transistor gate structures, the end-of-range irradiation region having a plurality of vacancies.

**19 Claims, 17 Drawing Sheets**

